

Application No. 10/735,842
Amendment dated March 18, 2005
Reply to Office Action dated December 22, 2004

Amendments to the Specification

Please replace the paragraph beginning on page 5, line 19 with the following amended paragraph:

It will be appreciated that a variety of sampling techniques can be used. For example, for certain classes of electric motors, the back emf can be sampled once every sampling period. However, merely taking a single back emf sample every sampling period can have shortcomings when applied to certain classes of low cost DC brush motors. The shortcomings relate to the fact that low cost DC brush motors are typically two pole motors with only 3, 5, or 7 commutator bars. This results in a back emf waveform that is not a pure DC voltage at a constant speed. Instead, the back emf is typically a sinusoidal-waveform. Figure 5 shows the back emf waveform for a DC brush motor having 5 commutator bars. As shown in Figure [[6]]5, the 5 commutator bars generate 10 waveform periods P per rotation of the motor armature. Each waveform period corresponds to one wavelength of the waveform. The sinusoidal waveform is shown superimposed over the average back emf.

Please replace the paragraph beginning on page 6, line 6 with the following amended paragraph:

A method for avoiding this problem is to sample the back emf generated by the motor a number of times during each commutation period P_d , and using an average of these readings to determine the motor speed. In one embodiment, the back emf can be sampled at least 4 times per commutation period. In another embodiment, the back emf can be sampled at least 8 times per commutation period. In still another embodiment, the back emf can be sampled at least 12 times per commutation period. In a preferred embodiment, the back emf is sampled at least 16 times over a given commutation period. Figure [[7]]6 illustrates an example where the back emf is sampled 16 times (indicated by dots provided on the waveform) over the wavelength of a given commutation period.

Please replace the paragraph beginning on page 6, line 16 with the following amended paragraph:

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It will be appreciated that the commutation period will vary from motor to motor and will also vary with the rotational speed of the motor. In one embodiment of the present invention, the commutation period was estimated to be at least 2.5 milliseconds. Thus, assuming the time period for the current to decay to zero once the drive circuit is turned off is about .5 milliseconds, the drive circuit is preferably turned off for a period of at least 3 seconds milliseconds to allow for current decay and a sampling period.